APPENDIX L

METRIC/ENGLISH CONVERSION PROCEDURES

INTRODUCTION

The HPMS software is capable of converting HPMS files from English to metric and vice versa when using the import process. The units are set by selecting *Admin Tools/Change State/Year*. Once the data have been imported into the system, the units cannot be changed. If a State chooses to work in different units, the data must be exported and then reimported after the units are reset.

All data are converted to metric by the HPMS software during the submittal process, *FHWA Submittal/Send Submittal*.

The following data items are converted:

Item No.	Description	Conversion Units
3	Reporting Units	Codes 0 (English);1 (Metric)
11-12	LRS MPT/KMPT	Miles - Kilometers
30	Section Length	Miles - Kilometers
35	Roughness (IRI)	Inches/Mile - Meters/Kilometer
51	D (Slab Thickness)	Inches - Millimeters
54	Lane Width	Feet - Meters
57	Median Width	Feet - Meters
59-60	Shoulder Width (Right and Left)	Feet - Meters
63-68	Curves (6 Values)	Miles - Kilometers
72-77	Grades (6 Values)	Miles - Kilometers
79	Weighted Design Speed	MPH - km/h
80	Speed Limit	MPH - km/h

HARD CONVERSION

Hard conversion is accomplished via a table lookup where a current value is converted directly to a predetermined value. In these cases, the computed rounded values may not always be identical to the soft conversion value. Hard conversion is used whenever possible for the following items:

Item	Data
54	Lane Width
59-60	Right and Left Shoulder Width
79	Weighted Design Speed
80	Speed Limit

For current lane or shoulder widths from 0.3 meters to 5.6 meters (1 foot to 18 feet), the hard conversion value is as found in Tables L-3 (English to metric) and L-4 (metric to English) for Items 54, 59, and 60. Any current value which is less than the lower limit or greater than the upper limit of the appropriate portion of these tables is converted using a soft conversion (e.g., 32 feet becomes 9.8 meters).

Weighted design speed (Item 79) and speed limit (Item 80) should be coded in multiples of 5. If coded in multiples of 5, and if within the limits of Tables L-1 (5 to 75 miles per hour) or L-2 (10 to 120 kilometers per hour), a hard conversion is used; otherwise, a soft conversion is made. Where there is no speed limit, code "A999" is used for either metric or English.

SOFT CONVERSION

A soft conversion is a computation using the current value times a conversion factor to produce a converted value (e.g., 13 feet x 0.3048 meter/foot = 3.9624 meters). Any computed value is then rounded to the required number of decimal positions (e.g., 3.9624 meters becomes 4.0 meters for a 1 decimal place precision).

The following list of factors are used when making soft conversions:

Field Units Being Converted	English to Metric	Metric to English
Miles - Kilometers	1.609344	1 / 1.609344
Feet - Meters	0.3048	1 / 0.3048
Inches per Mile - Meters per Kilometer	1 / 63.36	63.36
Inches - Millimeters	25.4	1 / 25.4
MPH - km/h	1.609344	1 / 1.609344

Soft conversion is used on the following data items:

Item No.	Description	Conversion Units
11-12	LRS MPT/KMPT	Miles - Kilometers
30	Section Length	Miles - Kilometers
35	Roughness (IRI)	Inches/Mile - Meters/Kilometer
51	D (Slab Thickness)	Inches - Millimeters
57	Median Width	Feet - Meters
63-68	Curves by Class	Miles - Kilometers
72-77	Grades by Class	Miles - Kilometers

Table L-1. **Hard Conversion for Speed**
ENGLISH TO METRIC — Using Factor 1.609344

MPH	km/h Hard Conversion	km/h Computed
5	**10**	8.05
10	**15**	16.09
15	**25**	24.14
20	**30**	32.19
25	**40**	40.23
30	**50**	48.28
35	**60**	56.33
40	**65**	64.37
45	**70**	72.42
50	**80**	80.47
55	**90**	88.51
60	**100**	96.56
65	**105**	104.61
70	**110**	112.65
75	**120**	120.70
BOLD indicates what is used for hard conversions.		
Values beyond 75 MPH and those that are NOT multiples of 5 use soft conversions rounded to the nearest km/h.		

Table L-2. Hard Conversion for Speed
METRIC TO ENGLISH — Using Factor 1 / 1.609344

km/h	MPH Hard Conversion	MPH Computed
10	**5**	6.21
15	**10**	9.32
20	**10**	12.43
25	**15**	15.53
30	**20**	18.64
35	**20**	21.75
40	**25**	24.85
45	**30**	27.96
50	**30**	31.07
55	**35**	34.18
60	**35**	37.28
65	**40**	40.39
70	**45**	43.50
75	**45**	46.60
80	**50**	49.71
85	**55**	52.82
90	**55**	55.92
95	**60**	59.03
100	**60**	62.14
105	**65**	65.24
110	**70**	68.35
115	**70**	71.46
120	**75**	74.56
BOLD indicates what is used for hard conversions.		
Values beyond 10 km/h, beyond 120 km/h and those that are NOT multiples of 5 use soft conversions rounded to the nearest MPH.		

Table L-3. Hard Conversion for Length
ENGLISH TO METRIC — Using Factor 0.3048

	Feet	Meters Hard Conversion	Meters Computed
Lane Width	6	**1.8**	1.83
	7	**2.1**	2.13
	8	**2.4**	2.44
	9	**2.7**	2.74
	10	**3.0**	3.05
	11	**3.3**	3.35
	12	**3.6**	3.66
	13	**3.9**	3.96
	14	**4.2**	4.27
	15	**4.5**	4.57
	16	**4.8**	4.88
	17	**5.2**	5.18
	18	**5.5**	5.49
Shoulder Width	1	**0.3**	0.30
	2	**0.6**	0.61
	3	**0.9**	0.91
	4	**1.2**	1.22
	5	**1.5**	1.52
	6	**1.8**	1.83
	7	**2.1**	2.13
	8	**2.4**	2.44
	9	**2.7**	2.74
	10	**3.0**	3.05
	11	**3.3**	3.35
	12	**3.6**	3.66

BOLD indicates what is used for hard conversions.

Values not shown for the item of interest are soft converted and rounded to the nearest tenth of a meter.

Table L-4. Hard Conversion for Length
METRIC TO ENGLISH — Using Factor 1 / 0.3048

	Meters	Feet Hard Conversion	Feet Computed
Lane Width	1.7	**6**	5.57
	1.8	**6**	5.90
	1.9	**6**	6.23
	2.0	**7**	6.56
	2.1	**7**	6.89
	2.2	**7**	7.21
	2.3	**8**	7.54
	2.4	**8**	7.87
	2.5	**8**	8.20
	2.6	**9**	8.52
	2.7	**9**	8.85
	2.8	**9**	9.18
	2.9	**10**	9.51
	3.0	**10**	9.84
	3.1	**10**	10.16
	3.2	**10**	10.49
	3.3	**11**	10.82
	3.4	**11**	11.15
	3.5	**11**	11.48
	3.6	**12**	11.80
	3.7	**12**	12.13
	3.8	**12**	12.46
	3.9	**13**	12.79
	4.0	**13**	13.11
	4.1	**13**	13.44
	4.2	**14**	13.77
	4.3	**14**	14.10
	4.4	**14**	14.43
	4.5	**15**	14.75
	4.6	**15**	15.08
	4.7	**15**	15.41
	4.8	**16**	15.74
	4.9	**16**	16.07
	5.0	**16**	16.39

	Meters	Feet Hard Conversion	Feet Computed
Lane Width (continued)	5.1	**17**	16.72
	5.2	**17**	17.05
	5.3	**17**	17.38
	5.4	**18**	17.70
	5.5	**18**	18.03
	5.6	**18**	18.36
Shoulder Width	0.3	**1**	0.98
	0.4	**1**	1.31
	0.5	**2**	1.64
	0.6	**2**	1.97
	0.7	**2**	2.30
	0.8	**3**	2.62
	0.9	**3**	2.95
	1.0	**3**	3.28
	1.1	**4**	3.61
	1.2	**4**	3.93
	1.3	**4**	4.26
	1.4	**5**	4.59
	1.5	**5**	4.92
	1.6	**5**	5.25
	1.7	**6**	5.57
	1.8	**6**	5.90
	1.9	**6**	6.23
	2.0	**7**	6.56
	2.1	**7**	6.89
	2.2	**7**	7.21
	2.3	**8**	7.54
	2.4	**8**	7.87
	2.5	**8**	8.20
	2.6	**9**	8.52
	2.7	**9**	8.85
	2.8	**9**	9.18
	2.9	**10**	9.51
	3.0	**10**	9.84
	3.1	**10**	10.16
	3.2	**10**	10.49
	3.3	**11**	10.82
	3.4	**11**	11.15
	3.5	**11**	11.48

	Meters	Feet Hard Conversion	Feet Computed
Shoulder Width (continued)	3.6	**12**	11.80
	3.7	**12**	12.13
	3.8	**12**	12.46
BOLD indicates what is used for hard conversions.			
Values not shown for the item of interest are soft converted and rounded to the nearest foot.			